

# Solving Rational Functions

P. 23 side

$$1) \frac{(x-1) \cancel{(x-1)} (x-2)}{\cancel{(x-1)} (x+1)} + \frac{x-3 \cancel{(x+1)}}{x-1 \cancel{(x+1)}} = 2 \quad \text{Common denominator}$$

$$\frac{(x-1)(x-2) + (x-3)(x+1)}{(x-1)(x+1)} = 2$$

$$\cancel{x^2-1} \quad \frac{x^2-3x+2 + x^2-2x-3}{\cancel{x^2-1}} = 2 \quad \text{FOIL}$$

$$2x^2 - 5x - 1 = 2(x^2 - 1)$$

Combine like terms + clear denominator

$$\cancel{2x^2} - 5x - 1 = \cancel{2x^2} - 2$$

$$\begin{array}{r} -5x - 1 = -2 \\ +1 \quad +1 \end{array}$$

$$\begin{array}{r} -5x = -1 \\ \hline -5 \quad -5 \end{array}$$

$$x = \frac{1}{5}$$

Solve.

$$1. \frac{x-2}{x+1} + \frac{x-3}{x-1} = 2 \quad x = \frac{1}{5}$$

$$2. \frac{x-3}{x+4} + \frac{2x+1}{x-4} = 3$$

$$3. \frac{x}{x+4} + \frac{2x-6}{x-3} = 3$$

$$4. \frac{x+4}{x-3} - \frac{2x-5}{x-2} = -1$$

$$5. \frac{3x}{6-2x} + \frac{5x+4}{2x+7} = 1$$

$$6. \frac{2x}{4-2x} + \frac{3x+2}{x+4} = 2$$

$$7. \frac{y+6}{y-3} - \frac{2y-4}{y-5} = -1$$

$$8. \frac{x-5}{x-2} - \frac{3x-2}{x+1} = -2$$

$$9. \frac{1}{y^2} - \frac{5}{y-1} = \frac{-5}{y}$$

$$10. \frac{2}{x^2} - \frac{6}{x-2} = \frac{-6}{x}$$

$$11. \frac{x+2}{x+3} + \frac{2x+5}{x-2} = 3$$

$$12. \frac{x-2}{x+4} + \frac{3x+2}{x-1} = 4$$

$$13. \frac{x-1}{x+5} + \frac{x+2}{x+3} = 2$$

$$14. \frac{x-2}{x+3} + \frac{3x+1}{x-2} = 4$$

$$15. \frac{4x}{x-1} + \frac{3x}{x+1} = 7$$

$$16. \frac{3x}{x-2} + \frac{2x}{x+2} = 5$$

$$17. \frac{x-1}{x+3} + \frac{x+2}{x-3} = 2$$

$$18. \frac{x-2}{x+4} + \frac{x+3}{x-2} = 2$$

$$19. \frac{2x+5}{x+3} - \frac{4x+1}{x-2} = -2$$

$$20. \frac{3x+1}{x-2} - \frac{5x+1}{x-1} = -2$$

$$21. \frac{x+2}{x-3} + \frac{x-1}{x-2} = 2$$

$$22. \frac{x+3}{x-2} + \frac{5x+1}{x-3} = 6$$

$$23. \frac{2x-3}{x} + \frac{5x-3}{x^2} - \frac{2x^2+x-6}{x^3} = 2$$

$$24. \frac{2x-1}{x} + \frac{3x-2}{x^2} - \frac{5x^2-x+3}{x^3} = 2\left(1 - \frac{3}{2x}\right)$$

Solve.

$$1. \frac{x+1}{x+2} - \frac{x-1}{x-2} = \frac{x-9}{x+2} \quad x = 3 \text{ or } 6$$

$$2. \frac{x+3}{x-1} + \frac{1-3x}{x+1} = \frac{2}{x^2-1}$$

$$3. \frac{2x+2}{x-1} + \frac{2x-7}{x+3} = \frac{7x+2}{3x-3}$$

$$4. \frac{x+7}{2x+2} - \frac{x+2}{x+1} = \frac{-3x+3}{5x-5}$$

$$5. \frac{3-x}{2x} + \frac{x+1}{x-1} = \frac{9x+1}{4x}$$

$$6. \frac{x-4}{x-1} + \frac{x-3}{x+6} = \frac{2x-3}{x+6}$$

$$7. \frac{x+1}{3x+2} + \frac{2x-1}{x+2} = \frac{4x+1}{3x+2}$$

$$8. \frac{2x-1}{2x} - \frac{x}{x+1} = \frac{x-2}{4x}$$

$$9. \frac{x}{x+1} - \frac{x-1}{2x+2} = \frac{x+1}{2x+2}$$

$$10. \frac{x-5}{2x-1} - \frac{x-4}{x-3} = \frac{-(x+1)}{2x-1}$$

$$11. \frac{3x}{3x+1} - \frac{x}{11x+1} = \frac{5x+3}{11x+1}$$

$$12. \frac{x-2}{x+2} + \frac{x-1}{2x+4} = \frac{2x-1}{2x+4}$$

$$13. \frac{x-2}{x-1} + \frac{1}{x-7} = \frac{x+1}{x-7}$$

$$14. \frac{x+3}{x-11} + \frac{x-8}{x-3} = \frac{4x+1}{x-3}$$

$$15. \frac{x+2}{2x-2} - \frac{x-2}{x-1} = \frac{6-x}{2x-2}$$

$$16. \frac{4x}{4x+2} - \frac{x-1}{2x+1} = \frac{2x+2}{4x+2}$$

$$17. \frac{4x+1}{8x+2} + \frac{x+2}{4x+1} = \frac{x}{8x+2}$$

$$18. \frac{2x+2}{3x} + \frac{x-3}{2x-5} = \frac{x+1}{3x}$$

$$19. \frac{x+4}{2x+4} - \frac{x-3}{x+2} = \frac{x-2}{2x+4}$$

$$20. \frac{x-1}{x+4} - \frac{x-9}{2x+8} = \frac{x+5}{2x+8}$$

$$21. \frac{x}{x+1} + \frac{x-3}{2x+2} = \frac{3x-3}{2x+2}$$

$$22. \frac{x+1}{x+2} + \frac{x-4}{x-3} = \frac{2x+1}{x+2}$$

$$23. \frac{3x+1}{6x} - \frac{x-1}{5x-4} = \frac{2x+1}{6x}$$

$$24. \frac{3x-1}{2x+3} - \frac{x-1}{2x-3} = \frac{x-1}{2x+3}$$